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The Structural Niche of *Anolis scriptus* on InaguaAnthony L. Laska¹

ABSTRACT. The only member of its genus on Inagua Island, Southern Bahamas, *Anolis scriptus leucophaeus*, is believed to be derived from *A. cristatellus* of Puerto Rico, which shares the latter island with 10 congeners. As has been demonstrated in the case of other "solitary" anoles on other islands, *A. scriptus* has a broader niche than its ancestor on a multi-species island.

INTRODUCTION

Differences in structural niche among sympatric species of *Anolis* in the West Indies have been described recently by several authors (Collette, 1961; Ruibal, 1961; Rand, 1962, 1964; Schoener, 1968). The significance of intraspecific sexual dimorphism and its ecological relationships has been discussed by Rand (1967), Schoener (1967), and Schoener and Gorman (1968). Rand and Rand (1967) suggest that the lone species of anole on Curaçao, *Anolis lineatus*, occupies a somewhat broader structural niche than most species of the Greater Antilles. Similar field observations were made of *Anolis scriptus*, which occurs with no congeners on Inagua. Results of a six-day stay in February of 1967 suggest a fairly broad niche for this species, as for *lineatus*.

Anolis scriptus leucophaeus is a medium-sized anole. The mean of the largest third of all male specimens examined was 67.6 mm ($n=36$) in snout-vent length, while corresponding females averaged 46.3 mm ($n=70$). The closest relative of this species is *A. cristatellus cristatellus* of Puerto Rico (Gorman et al., 1968).

Great Inagua is located about 110 km north of Haiti, approximately 100 km from easternmost Cuba. About 70 by 30 km, it is predominantly flat, the highest point being East Hill at 40 meters. Lower hills dot the eastern half of Inagua's coastline. A large,

¹ Department of Biology, Tulane University, New Orleans, La. 70118

shallow, saline lake fills a substantial area in the western interior of the island, and brackish mud flats are common. Inagua receives little rain, a yearly mean of 612 mm; and the annual temperature range is 22 to 30°C.¹ Cactus, thorn scrub, and low bushes are common in the dry flatlands, while stands of buttonwood and larger trees are found on low-lying ground. Sizeable palmetto groves occur on low aeolian hills along the shores in the regions studied to the northwest and south.

The low profile of Inagua indicates that this island is relatively young. This young age, combined with the movement of currents toward the northwest and the presence of submerged island banks between Puerto Rico and the southern Bahamas, accounts for the close relationship between the *Anolis* faunas of Puerto Rico and Inagua (Gorman et al., 1968).

FIELD METHODS

For this study anoles were observed and collected in western and southern parts of Great Inagua and on Sheep Cay, off Northwest Point. They were found most frequently in palmetto groves and stands of large trees but were rarely seen in thorn scrub, although several sub-adults were observed in dense patches of cactus and adder's tongue in Matthew Town. No apparent intraspecific variation was found among *scriptus* collected on Inagua proper or when these were compared with specimens taken from Sheep Cay.

To determine perch preference of this species, perch height and diameter were recorded for anoles observed at five principal localities: Northwest Point, Sheep Cay, Matthew Town, and neighboring areas of Salt Pond Hill and Conch Shell Hill. A total of 168 individual observations was made with an effort to avoid repetition. All but 23 entries were seen on trunks of palmetto trees and trunks and branches of larger trees. Those exceptions were in clumps of cactus, on stumps, stone walls, fences, and major trunks in brush piles. The exceptions are not included in calculations.

RESULTS AND DISCUSSION

Most of the lizards recorded were perched above ground level and below 12 feet. The data in Table 1 suggest this species distributes itself vertically as a function of sex and size of individuals.

¹ These are means of the extreme temperatures between 1954 and 1968.

With four zones available (following Rand, 1964), 59 percent of adult males were observed between 6 and 10 feet, 68 percent of adult females perched between 3 and 5 feet, while 74 percent of juveniles were seen within 3 feet of the ground. Several juveniles were found on the ground or in leaf litter. Results of X^2 tests show that adult males were found significantly higher ($34 > 5'$; $22 < 5'$) than adult females ($4 > 5'$; $33 < 5'$; $P < .001$). Adult females occurred significantly higher ($29 > 3'$; $8 < 3'$) than juveniles ($5 > 3'$; $14 < 3'$; $P < .001$).

Table 2 compares *Anolis scriptus* with *A. lineatus* of Curaçao (Rand and Rand, 1967), both of which occur with no congeners. Rand's (1964) figures for the structural niche of *A. cristatellus cristatellus* are included for comparison between *A. scriptus* and its nearest relative. The vertical distribution of *scriptus* is nearly as broad as that of *lineatus* but its preferred perch diameter appears more restricted. Perch diameter limitation for *scriptus* is probably a reflection of the species' association with palmetto trees, which are prevalent on much of the island. Since the typical palmetto trunk measured 3 inches, a high number of entries for *scriptus* is found in the 1/2-3 inch column in Table 2. Uniformity in available perch diameters is reflected by a lack of statistical significance for comparisons of preferred perch diameter for *scriptus* males, females, and juveniles in Table 1.

Total height of the perch was incidentally recorded for 41 of the observations and the ratio of perch position to total tree height was calculated. Means for these ratios are given in Table 3 for males, females, and juveniles. Since most of the trees in the localities did not exceed 12 feet, those over 12 feet were eliminated in calculating the second series of figures; the ratios being based on 22 remaining individuals.

When tree heights of 12 feet and less are considered, the position of lizards relative to the tree crown is higher than when taller trees are included, as indicated by a substantially greater ratio for the former. Although an optimum perch height relative to the ground is suggested by these data, the inherent bias of the observer's position may have some influence.

Of the juveniles observed, 74 percent were less than three feet above ground level, away from most of the larger adults that might try to catch and eat them. Since these juveniles are not competing for food with many larger anoles, they have a better chance of developing faster in this niche (Rand, 1967).

Scriptus, as a solitary anole, occupies a broader structural niche than typical species occurring with congeners. But its niche is not nearly so broad as that filled by the totality of a mixed *Anolis* fauna (Rand, 1964).

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Table 1. Structural niche of *Anolis scriptus*.
Number of Individuals Recorded

Perch diameter	Number of Individuals Recorded				
	Adult males	Adult females	Juveniles	Smaller individuals*	Total**
Perching height	>3 1/2-3 <1/2 Tot.	>3 1/2-3 <1/2 Tot.	>3 1/2-3 <1/2 Tot.	>3 1/2-3 <1/2 Tot.	>3 1/2-3 <1/2 Tot.
>10'	1 1	1 1		2 1 3	2 2 4
6-10'	11 22 33	2 1 3	1 1	2 10 1 13	13 32 1 46
3-5'	6 12 1 19	7 18 25	1 3 4	11 30 41	17 42 1 60
<3'	1 2 3	7 1 8	3 10 1 14	6 24 2 32	7 26 2 35
Total	18 37 1 56	9 27 1 37	4 14 1 19	21 65 3 89	39 102 4 145

* Adult females plus juveniles plus unidentified individuals under two inches in snout-vent length.

** Adult males plus smaller individuals.

Table 2. A comparison among *Anolis scriptus* of Inagua, *A. lineatus* of Curaçao, and *A. c. cristatellus* of Puerto Rico.

Percent of Number of Each Species Recorded

	Perch height				Perch diameter		
	<3 ft.	3-5 ft.	6-10 ft.	>10 ft.	>3 in.	½-3 in.	<½ in.
Inagua <i>scriptus</i>	24%	41%	32%	3%	27%	70%	3%
Curaçao <i>lineatus</i>	32%	33%	27%	7%	67%	31%	2%
Puerto Rico <i>cristatellus</i>	47%	40%	11%	1%	65%	27%	7%

Table 3. Ratio of perch height to tree height for *Anolis scriptus*.

Tree height	Adult males	Adult females	Juveniles
6 ft. - 26 ft.	.42	.37	.14
6 ft. - 12 ft.	.67	.41	.20